**Population Relationship Study: Deer/Wolf Predation**

**The story:**

There is a large island in Lake Superior with a large farming community on its eastern half. The other half has too many rocks and large trees across its landscape, and as such cannot be used for farming. It remains a large natural forest. In the 1950’s, farmers on the island had noticed that wolves were eating some of their livestock. The farmers came together one weekend in the summer and hunted the wolves to extinction on the island.

In the early 1990’s, scientists studying forests in the area found the island had a larger than expected deer population. There were so many deer that they had eaten any shrub or leaf they could reach, and were now starving. This situation threatened the forest biome at all levels. The scientists spoke with the farmers and discovered that the natural wolves on the island had been massacred 40 years earlier. The scientists discussed the situation with the farmers, and explained that the forest on their island was in jeopardy. The farmers and their families all enjoyed having the forest so close by, and enjoyed living so close to all the creatures it gave life to. The scientists explained that wolves were necessary to keep the forest ecosystem in balance. It was agreed that the scientists would bring in 10 wolves and re-introduce them to the forest. They monitored both the deer and wolf population for 10 years. Their data is shown below:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Table 1 - Island data for Wolf and Deer populations from 1996 - 2005 | | | | | |  |
| Year | Wolf Population | Deer Population | Deer Born this year | Deaths: Predation | Deaths: Starvation | Deer Population Change |
| 1996 | 10 | 2,000 | 800 | 400 | 100 | 300 |
| 1997 | 12 | 2,300 | 920 | 480 | 240 |  |
| 1998 | 16 | 2,500 | 1,000 | 640 | 500 |  |
| 1999 | 22 | 2,360 | 944 | 880 | 180 |  |
| 2000 | 28 | 2,224 | 996 | 1,120 | 26 |  |
| 2001 | 24 | 2,094 | 836 | 960 | 2 |  |
| 2002 | 21 | 1,968 | 788 | 840 | 0 |  |
| 2003 | 18 | 1,916 | 766 | 720 | 0 |  |
| 2004 | 19 | 1,952 | 780 | 760 | 0 |  |
| 2005 | 19 | 1,972 | 790 | 760 | 0 |  |

Assignment and Questions:

1. Fill in the last column for deer population change using the births and deaths data [C: 9 marks]
2. Create a line or bar graph that shows both the deer and wolf populations as they changed over the 10-year study. [C: 5 marks]
3. Describe your graph of the deer population over the 10 years. Why do you think the different changes are happening? [A: 2 marks]
4. Describe the wolf population over the 10 years. What do you notice about the last three years specifically? Why do you think this is happening?[A: 3 marks]
5. Why do you think the deer population increased at first, even though the wolves had been introduced? Support your answer. [A: 2 marks]
6. Why do you think the scientists wanted to re-introduce the wolves to the island? Do you agree with their decision? Why or why not? [A: 2 marks]
7. What do you think would have happened to the deer population on the island had the wolves not been introduced? (Think about consequences to other plants and animals in the ecosystem as well) [A: 3 marks]
8. Do you believe that predation is necessary in nature? Give evidence from this study to support your opinion. [A: 2 marks]
9. How did agriculture impact the natural environment in this situation? Why is it important that humans examine their impact on natural ecosystems? [A: 2 marks]
10. Describe the deer population in relation to its carrying capacity at the beginning and end of the study. What factors would you think influence carrying capacities of populations? [A: 3 marks]

Marking Scheme: Deer/Wolf Superior

1. Pop change calculations[9 marks]
2. Graph [5 marks]

1 mark per labelled axis

1 mark title

1 mark each line on graph (wolf, deer)

1. Describe [1 mark]

Why do you think changes are happening [1 mark]

1. Wolf pop over 10 years [1 mark]

Last 3 years [1 mark]

Why is it happening [1 mark]

1. Why deer pop increase [1 mark]

Support [1 mark]

1. Why reintroduce wolves? Agree? [2 marks]
2. What would happen if wolf hadn’t been reintroduced? [ 3 marks]
3. Is predation necessary? [1 mark]

Support [1 mark]

1. How did agriculture impact? [1 mark]

Humans examining impact [1 mark]

1. Describe deer in relation to carry capacity at beginning and end of study. [1 mark]

What factors influenced? [2 marks]